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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,000	08/21/2003	Michael L. Book	MFS-31785-1	8651

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NASA/MARSHALL SPACE FLIGHT CENTER
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EXAMINER	
ANDREA, BRIAN K	

ART UNIT	PAPER NUMBER
3662	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/646,000	BOOK ET AL.	
	Examiner	Art Unit	
	Brian K Andrea	3662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,12-17 and 23-25* is/are rejected.

7)☒ Claim(s) *6-11 and 18-22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *21 August 2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-5, 12-17 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,835,199 to Phillips et al. (hereinafter, "Phillips") in view of U.S. Patent Nos. 4,386,848 to Clendenin et al. (hereinafter, "Clendenin") and 6,031,601 to McCusker et al. (hereinafter, "McCusker").

With regard to claim 1, Phillips teaches a system comprising: a video guidance sensor including: means, including a stationary tilted mirror 180 and a laser illuminator 110 for directing output light for reflection from a target such that return light reflected by said target is received by a sensor; and a time of flight range measuring sub-system for measuring a time period taken by output light to travel to the target and to be received as return light (see column 6, lines 60-64), said range measuring sub-system comprising: a first photodetector 102 for directly receiving the output light and for producing a corresponding output signal; a second photodetector 104 for receiving the return light and for producing a corresponding output signal; and a digitizer 206, comprising at least one analog to digital converter, for receiving the output signals from said first and second photodetectors and for producing corresponding digital data; and a signal processing unit comprising a digital signal processor for processing the digital

data produced by said digitizer to produce an output representative of said time period and thus of the range to the target, and for supplying said output to a computer 200 (see column 6, lines 60-64).

Phillips teaches that the amplitude of the outgoing light may be amplified (see column 6, lines 40-46) but does not teach the control of the amplitude in real time. McCusker, however, teaches the use of an automatic gain control in a time-of flight rangefinding system (see column 3, lines 48-51) for adjusting the amplification of outgoing light. It would have been obvious to modify the amplifier used by Phillips to incorporate the use of an automatic gain control as taught by McCusker so as to ensure that the detectors are not being over saturated.

Phillips teaches that the return light is imaged and displayed using a signal processing unit 210 and computer 200 but does not teach the use of a separate video sensor in the system. However, Clendenin teaches a time-of-flight rangefinding system which uses a beam splitter so that a separate video camera sensor may receive and image the return light (see column 7, lines 38-47). It would have been obvious to modify Phillips to use a beamsplitter in the path of the return light so as to incorporate the use of a video camera to image the scene that is being measured. Phillips teaches the use of processing and a computer, as stated above, for imaging and it would have been obvious to use these same techniques with the video camera as well as the use of processing and displaying video camera signals is extremely well known in the art.

With regard to claims 2-4, 15 (see above discussion with regard to claim 15 as well) and 16, Phillips teaches the use of a programmable gain amplifier (see column 34,

lines 48-52) and a buffer memory (see column 7, lines 44-47). It would have been obvious to place these elements at any point along the signal line after detection and before processing because the signal remains unchanged except for the action that each element is taking with respect to the signal (you can perform any of the operations – digitizing, amplification, storage – in any order after detection without a deterioration of the signal).

With regard to claims 5 and 17, the use of a FIFO memory is well known in the art and would have been an obvious choice for Phillips to use as the temporary memory element.

With regard to claims 12-14 and 23-25, Phillips is silent on the type of processing that is actually used, stating only that the time-of-flight of the signal is measured. However, the use of a fixed fraction trigger event criteria to signal the transition from one cycle to another is well known in the art and would have been obvious . Additionally, the detection of the middle point (whether half way between 0% and 100% or 10% and 90%) of a received signal is a well known method of determining the time of arrival of a signal.

Allowable Subject Matter

3. Claims 6-11 and 18-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The references have been cited to show the current state of the art of laser imaging and rangefinding.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K Andrea whose telephone number is (703) 605-4245. The examiner can normally be reached on M-F 7:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on (703) 306-4171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BKA

BKA
24 September 2004

BERNARR E. GREGORY
PRIMARY EXAMINER
AU. 3662